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Mind the Gap: An Analysis of “Gap Year” Prevalence, Productivity, and Perspectives Among Radiation Oncology Residency Applicants

Baho Sidiqi, BS, Erin F. Gillespie, MD, Chunyu Wang, MD, Melissa Dawson, MS, Abraham J. Wu, MD

Department of Radiation Oncology, Memorial Sloan-Kettering Cancer Center, New York, New York

Abstract

Purpose—Medical students may take a year off during medical school (a “gap year”) to strengthen their applications for competitive specialties such as radiation oncology. This can incur significant financial and opportunity costs. We sought to understand the prevalence, nature, and funding of gap years undertaken by radiation oncology applicants.

Methods and Materials—An anonymous survey was emailed to all applicants to a single radiation oncology program from 2015 to 2017. Survey questions assessed gap year utilization, funding, motivations, and perceptions. Separately, all 2017 Electronic Residency Application Service (n = 176) applications to this program were reviewed for reference.

Results—The 2017 cohort had a response rate of 69% (n = 121), with an overall response rate of 39% (n = 194) for applicants between 2015 to 2017. Of non-MD/PhD respondents, 33% (n = 53) reported taking a gap year. The main reason for a gap year (68%) was to produce more publications, and 50% of all respondents viewed a gap year as “important” or “very important” for matching in radiation oncology. Twenty-eight students (53%) reported using personal loans, savings, or family support to cover gap year expenses. Most who took a gap year (83%) viewed funding as “difficult” or “extremely difficult” to obtain. Fewer publications before gap year and more dedicated research time were significant predictors of undertaking a gap year, whereas sex, marital status, dependent status, and financial aid were not significant.

Conclusions—Research productivity is commonly perceived as important for matching in radiation oncology, leading many applicants to take gap years, which are usually supported by personal financial resources. We did not identify statistically significant socioeconomic disparities between applicants that took a gap year and those who did not. However, further study is warranted to determine whether pressure to take a gap year, particularly in the absence of readily available funding sources, deters some potential applicants from pursuing radiation oncology altogether.

Reprint requests to: Abraham J. Wu, MD, Department of Radiation Oncology, Memorial Sloan-Kettering Cancer Center, 1275 York Ave, Box 22, New York, NY 10065. Tel: (212) 639-5257; abewu1@gmail.com.

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Introduction

Every year, a number of medical students decide to take a “gap year” (a year off from the standard 4-year medical school curriculum) before applying for residency. Gap years are most commonly undertaken for the purpose of strengthening residency applications through acquiring more research experience and publications, especially if entering a competitive field.^{1,2} The potential advantages of a gap year must be balanced against the delay in applying to residency and, therefore, delaying the start of one’s wage-earning career. Because not all prospective radiation oncology applicants are able or willing to take a gap year, this practice could have an impact on the profile and mix of medical students who are choosing radiation oncology and successfully matching into the field.

Students consume significant time, financial resources, and other opportunity costs to undertake gap years. To our knowledge, no data exist on the financial and emotional burden this may place on medical students and their career planning. We sought to assess why some students take a gap year and some do not and the expectations and potential barriers that students encounter in making that decision. We therefore administered an online survey to analyze applicants’ use of gap years and the role that factors such as funding and availability of opportunities played in their decisions. We had particular interest in whether socioeconomic factors influenced whether candidates ultimately took a gap year. To provide background data for reference, we also directly reviewed 2017 Electronic Residency Application Service (ERAS) applications received by our residency program.

Methods and Materials

Application review

The institutional review board at our institution deemed this study exempt. All 2017 ERAS applications (n = 176) to the radiation oncology residency program at Memorial Sloan Kettering Cancer Center (MSKCC) were downloaded, and data were collected on age, medical school, medical program, gap year status, and publication history. The MSKCC residency program is a large, well known, and academically oriented residency program in a major cancer and research institution. Seventy-eight percent (167 of 215) of all US applicants to radiation oncology residency in the 2017 to 2018 match cycle applied to our program. Gap years were identified by a detailed review of applicants who answered “yes” to the question on whether their medical education was “interrupted.” External funding for gap years was inferred from the “honors/awards” section, and data on number of publications was based on published or accepted (not merely submitted) manuscripts. Gap year productivity was calculated by comparing dates of manuscript publication relative to the gap year. Medical school ranking was based on the US News and World Report rankings for 2017.

Survey

A voluntary and anonymous online survey was sent by email to all applicants who submitted an application to the MSKCC residency program between 2015 and 2017. Initial invitations were sent 10 days after 2017 match results were released on March 17, 2018, to avoid any

concern that responses (or lack thereof) could affect the match process. An additional 3 email reminders were sent, and the survey was closed on April 16, 2018. Most emails for 2015 and 2016 ERAS applicants were no longer active (because they were typically hosted by the medical school from which they graduated). A search of the American Society for Radiation Oncology member directory identified a small number ($n = 6$) of active email addresses for these applicants.

The survey comprised a total of 32 questions, but certain questions were only shown based on previous responses. Questions included background information on age, sex, marital/family status, additional degrees completed, financial aid needs, loan burden, gap year use, funding, number of publications, and motivations and perceptions regarding gap year and match status. Four or 5-point Likert scales were used to assess applicant opinions regarding the importance of certain statements or their degree of agreement with certain statements. The survey was administered, and all data were collected through Research Electronic Data Capture hosted at the study institution. The full survey instrument is included in Appendix EA (available online at <https://doi.org/10.1016/j.ijrobp.2019.02.006>).

Analysis

Descriptive statistics were collected for all variables in the survey. When applicable, age was adjusted based on gap year length. Continuous variables were compared using independent *t*-test or analysis of variance. Categorical variables were compared using binary univariate logistic regression to assess whether certain baseline factors were predictive of taking a gap year. All analysis was done using SPSS (IBM SPSS Statistics for Macintosh, Version 24.0. Armonk, NY) using a *P* value $<.05$ for statistical significance where not otherwise stated. MD/PhD applicants were analyzed separately given that, by definition, they are already interrupting their medical training for the purpose of research and would not therefore be expected to take an additional gap year.

Results

The 2017 applicant cohort had a response rate of 69% and the 2015 through 2016 cohorts had a response rate of 23% for an overall response rate of 39% ($n = 194$). From the 2017 applicant cohort, 121 responded, representing 56% (121 of 215) of all radiation oncology applicants this cycle. Characteristics of survey respondents and ERAS applicants were compared (Table 1). Approximately one-third of non-MD/PhD applicants (33%) reported taking a gap year in the survey, compared to 24% who could be identified through ERAS review (Table 1). Average age and total number of publications were similar between both groups.

Those taking a gap year had fewer publications (before their gap years) than non-gap year applicants, and this was consistent across both ERAS review and survey responses. The average number of publications arising from a gap year was approximately 4, based on ERAS review. On ERAS review, medical school ranking was higher among gap year students than non-gap year students, but the United States Medical Licensing Examination step 1 score was not significantly different (Table 2).

Table 3 provides background information on survey respondents. Most respondents were single (63%) and reported no dependents (85%). Dedicated research time was offered at approximately 60% of medical schools, providing a median of 3 months' time. Most applicants decided to apply to radiation oncology during their third year, with 60% deciding during the third year or later. Among the non-MD/PhD cohort, 68% of applicants required financial aid during medical school, compared with 25% in the MD/PhD cohort. Of those who required financial aid during medical school, approximately 50% had greater than \$200,000 in loans.

Students were also surveyed regarding gap year motivations, activities, and funding for the year (Table 4). Of 53 students who took a gap year, most were taken to obtain more publications (68%) or additional graduate degrees (21%). The largest single source of funds for gap year living expenses was family support (38%), followed by stipends from medical school (23%). The extent of external funding varied, and approximately 25% did not have any external funding sources. About half of applicants who had funding would not have pursued a gap year without it. Conversely, 29% of respondents (30 applicants) who did not pursue a gap year would have undertaken one if they had a source of funding. Table 5 provides information on the perceived importance of the gap year by applicants. Most students (83%) found it difficult or extremely difficult to obtain funding, whereas most (58%) reported that gap year opportunities (independent of funding) were easy or very easy to find.

Roughly half of applicants felt that a gap year was important or very important for applying in radiation oncology. The most common reasons for not taking a gap year among non-MD/PhD applicants were being unable to delay start of residency (42%) and already having sufficient research experience (29%). If including MD/PhD responders, 29 out of 34 respondents noted having sufficient research as a reason for not taking a gap year. Seven (7%) of those who did not take a gap year cited the lack of funding as the primary reason not to take one, whereas another 7 cited the lack of suitable opportunities. There was no correlation between taking a gap year or having a PhD and successfully matching into residency ($P = .515$).

Significant univariate predictors of taking a gap year were the number of publications and abstracts before the gap year (Table 6). As the number of publications/abstracts rose, the odds of taking a gap year decreased ($P = .007$). Attending a medical school that provides dedicated research time was positively correlated to taking a gap year (odds ratio, 3.911, $P < .001$). Sex, age, marital status, dependent status, having a master's degree, and needing financial aid were not significantly correlated with taking a gap year.

Discussion

To our knowledge, this single-institution study is the first to analyze ERAS and applicant survey data regarding the usage of gap years and its impact on medical students. As expected, gap years were most commonly taken for the purpose of gaining research experience and publications, and the most significant predictor of taking a gap year was a lower number of publications before a prospective gap year. Overall, one-third of non-

MD/PhD applicants reported taking a gap year, which results in over 50% of all applicants (including MD/PhDs)² taking dedicated time for research. This suggests that research productivity has become a de facto requirement for matching into radiation oncology, and indeed 50% of survey respondents reported that a gap year is “important” or “very important” to matching.

An applicant’s medical school is a significant predictor of whether he or she takes a gap year. Applicants from higher-ranked medical schools were more likely to take gap years, as were applicants from schools that provide dedicated research time. This may reflect greater availability and encouragement of research opportunities at higher-ranked medical schools, particularly because research funding is a major determinant of US News & World Report rank. It is also likely that research-oriented students tend to matriculate at higher-ranked medical schools that offer more research opportunities.

Importantly, taking a gap year (even a funded one) has the significant opportunity cost of delaying one’s wage-earning career as a physician, which could exacerbate the already high financial burden of attending medical school and thereby favor more socioeconomically advantaged medical students in applying and matching into radiation oncology. However, we did not find that loan burden, age, or family status correlated to the usage of gap years, which provides some reassurance that gap years are not clearly increasing socioeconomic disparities in the applicant pool. We speculate that students who already have socioeconomic stressors may feel that because they are already under significant financial burden, they should not allow the relatively smaller additional burden of a gap year to dissuade them from maximizing their chances of matching into their desired residency and specialty, particularly if there are long-term gains in salary potential.

Nevertheless, other survey results indicate that the financial and practical obstacles to taking a gap year are significant and may affect decision making for radiation oncology applicants. In particular, approximately 1 out of 5 respondents who did not take a gap year would have done so if they had a source of funding. Conversely, of those who had external funding for their gap year, approximately half would not have done so without this funding. Free-text comments from survey respondents confirm anxiety regarding the financial costs of a gap year, with 8 respondents writing comments lamenting how matching into radiation oncology is becoming “expensive.” (Full comments by respondents are included in Appendix EB; available online at <https://doi.org/10.1016/j.ijrobp.2019.02.006>). These results and comments raise the concern that this implicit pressure to take a gap year favors applicants who already have the advantages of independent financial support and/or attend medical schools with availability and support for extended research opportunities. Furthermore, there may be students interested in radiation oncology who cannot or will not pursue a gap year and consequently decide to apply in another field, although this cannot be assessed with our data. It should be noted, however, that there has been a recent downward trend in the number of applicants per radiation oncology residency position (from 1.45 in 2011 to 1.25 in 2018), and if research and gap year expectations dissuade prospective applicants from applying, this could ultimately affect the overall quality of medical students entering our field and even contribute to a situation in which there are no longer enough applicants to fill available slots.

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Currently, however, given the competitiveness of the radiation oncology match and the fact that most residency programs are located in major academic centers, it is likely that research experience and productivity will continue to be an important qualification for prospective applicants. In the 2018 survey of program directors (n = 26), demonstrating involvement and interest in research was third in importance behind United States Medical Licensing Examination step 1 scores and letters of recommendations in selecting which applicants to interview.² Furthermore, based on 2018 match data,⁵ the total mean number of abstracts, presentations, and publications of U.S. senior medical students matching into radiation was 15.6, second only to neurosurgery. Therefore, the pressure to take a gap year will likely persist. This situation could be made more equitable through increased access to external funding sources for gap years; 83% of applicants viewed this as difficult or extremely difficult to obtain. Meanwhile, over 40% of applicants reported finding a suitable gap year either difficult or very difficult. Creating a publicly available centralized database with available gap year opportunities could be a solution.

It is also worth considering whether the additional qualifications produced via a gap year are intrinsically meaningful to radiation oncology residencies and the specialty at large. Is an applicant with more publications because he or she took a gap year more likely to be a successful resident or to have an academic career than one who did not? An applicant who is able to produce a modest, but meaningful, amount of research within the standard 4 years may actually have superior academic potential to the one who achieves greater research output via a gap year. Furthermore, some applicants commented that a gap year is pursued not out of “genuine interest” but purely for playing the “game,” with evidence showing an exponential increase in articles published by medical students that remain uncited.⁶ In this cynical interpretation, the gap year is simply an artificial barrier to entry to the field that not only erects socioeconomic barriers for prospective applicants, but also fails to meaningfully differentiate those applicants who are able to take a gap year. However, it should be acknowledged that other metrics for comparing applicants, such as Step 1 scores, also have limitations. Interestingly, we found no correlation between taking a gap year and Step 1 score.

There are inherent limitations to these data, which rely on a voluntary and anonymous survey of applicants to a single academic program. In particular, our highly competitive and research-oriented program may be drawing more academically oriented applicants compared to the pool at large. However, a significant majority of all radiation oncology applicants (78% in 2017) applied to our program. The mean Step 1 score from our 2018 applicant pool (246.2) is also nearly identical to the mean reported in the NRMP 2018 Outcomes survey (246.4 based on 176 respondents), which is one of the few available reference metrics for the applicant pool at large. Though this is a limited and single metric, it suggests our sample is broadly representative of the pool applying in 2018. Any voluntary survey is also subject to response bias, in that respondents more likely to respond to such a survey may not be representative of the whole group. However, the response rate for the 2017 application class was relatively high at 69%, and the lower response rate of 39% for earlier applicant classes is not surprising, given that many of the listed emails are now defunct or go unchecked. Furthermore, the distribution of responses was not significantly different when comparing survey responses with direct review of ERAS application data on endpoints such as age, sex,

and research output. We also note that a survey of actual applicants cannot assess a “gap year effect” on potential applicants who may have decided against applying to radiation oncology at all because of a perceived requirement to produce research by taking a gap year. Finally, with 93% of applicants matching, this study may be underpowered to differentiate whether a gap year affects match rate. However, recent self-reported data do suggest that a research year and number of publications correlate with the number of interview invites.⁷

Conclusions

We report the first analysis of gap year use by residency applicants. These data confirm that gap years are common, that the financial and practical burdens of a gap year are significant, and that many students choose to take a gap year based on availability of funding, which is not perceived to be readily accessible. This, in turn, poses a broader question of whether residency programs are widening the gap between students who have access to funding and research opportunities and those who do not (particularly those who attend lower-ranked medical schools). It also raises the question of whether research productivity during a gap year meaningfully demonstrates applicant quality or potential. Because the medical students who choose and then successfully match into radiation oncology will shape the future of radiation oncology, these data should inform a broader discussion about how residency programs value research productivity and the potential burden this places on prospective applicants.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Summary

We analyzed Electronic Residency Application Service and survey data regarding the use of a “gap year” among applicants to radiation oncology. One-third of non-PhD applicants take gap years primarily for research productivity. Most gap year students report external funding as difficult to obtain, and over half rely on personal funding. With the perceived belief that gap years are important for matching, these data raise questions about whether potential applicants are being deterred, affecting the demographics of radiation oncology overall.

ERAS applicants (2017) compared to survey respondents (2015–2017) (95% confidence interval)

Table 1

	No gap year		Gap year		MD/PhD	
	ERAS	Survey	ERAS	Survey	ERAS	Survey
Applicants (n)	101	107	31	53	35	34
Average age	27.5 (26.9–28.1)	27.6 (27.0–28.2)	26.3* (25.5–27.1)	27.5* (26.7–28.3)	30.2 (29.7–30.9)	30.7 (30.1–31.3)
Average publications	4.1 (3.1–5.1)	4.0 (3.4–4.6)	Pre-gap: 2.1 (1.4–2.8) Post-gap: 6.4 (4.8–7.8)	Pre-gap: 2.5 (1.7–3.3) Post-gap: 6.7 (5.4–8.1)	8.8 (7.2–10.5)	9.1 (7.3–10.8)

Abbreviation: ERAS = Electronic Residency Application Service.

* Adjusted for length of gap year.

Table 2

2017 ERAS applicant data (95% confidence interval)

	No gap year	Gap year	MD/PhD
Applicants (n)	101	31	35
Average medical school ranking	39.3 (33.0–45.6)	14.8 (8.3–21.3)	36.7 (26.4–47.0)
Average USMLE step 1 score	248.6 (245.9–252.3)	242.5 (235.7–249.3)	241.7 (236.9–246.4)

Abbreviations: ERAS = Electronic Residency Application Service; USMLE = United States Medical Licensing Examination.

Table 3

Characteristics of all survey respondents

Characteristic	Response, n (%)
Sex	
Female	60 (32)
Male	133 (68)
Prefer not to answer	1 (1)
Marital status	
Married	72 (37)
Single	122 (63)
Dependents	
Yes	29 (15)
No	165 (85)
Timing of decision to pursue radiation oncology	
Prior to MS	14 (7)
MS1	28 (14)
MS2	34 (18)
MS3	88 (45)
MS4	30 (16)
Other degrees prior or during gap year	
None	125 (64)
PhD or equivalent	34 (18)
MPH/MBA/MS	34 (18)
JD	1 (1)
Financial aid loan burden	
\$0	51 (30)
\$1–\$49,999	9 (5)
\$50,000–\$99,999	10 (6)
\$100,000–\$149,999	21 (12)
\$150,000–\$199,999	18 (11)
\$200,000–\$249,999	28 (16)
\$250,000+	32 (19)
Required financial aid during medical school (excludes MD/PhD applicants)	
Yes	109 (68)
No	51 (32)
Research time offered by med school	
Yes	116 (60)
No	78 (40)
Average mo offered (95% confidence interval)	3.1 (2.5–3.7)

Table 4

Responses from surveyed gap year applicants

Question	Response, n (%)
What was your primary motivation for taking a gap year?	
Obtain more publications	36 (68)
Obtain additional degrees	11 (21)
Medical or family leave	3 (6)
Other	3 (6)
What was your source of financial support for gap year?	
Personal savings	3 (6)
Family support	20 (38)
Research lab/mentor stipend	4 (8)
Medical school stipend	12 (23)
Grant personally obtained	9 (17)
Other - additional loans	5 (9)
What was the total value of external funding received for gap year?	
N/A	14 (26)
\$1–\$9,999	9 (17)
\$10,000–\$19,999	6 (11)
\$20,000–\$29,999	9 (17)
\$30,000–\$39,999	11 (21)
\$40,000+	4 (8)
Would you still have taken a gap year without external funding?	
Yes	20 (51)
No	19 (48)
What was your primary activity during gap year?	
Clinical research	21 (40)
Laboratory-based research	18 (34)
Degree (MPH, MBA, MS)	9 (17)
Medical/family leave	3 (6)
Other	2 (4)
<i>Statement: Taking a gap year was a productive use of my time</i>	
Strongly agree	30 (57)
Agree	18 (34)
Neither agree nor disagree	3 (6)
Disagree	1 (2)
Strongly disagree	1 (2)
<i>Statement: Taking a gap year improved my chances of matching</i>	
Strongly agree	37 (70)
Agree	10 (19)
Neither agree nor disagree	5 (9)
Disagree	0 (0.0)

Question	Response, n (%)
Strongly disagree	1 (2)

Abbreviation: N/A = Not Applicable.

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Table 5

Respondent perceptions of gap year

Question	Response, n (%)
<i>All applicants: How easy is it to obtain funding for a gap year?</i>	
Very easy	1 (1)
Easy	32 (17)
Difficult	108 (56)
Very difficult	53 (27)
<i>All applicants: How easy is it to find gap year opportunities (funded or unfunded)?</i>	
Very easy	17 (9)
Easy	95 (49)
Difficult	71 (37)
Very difficult	10 (5)
<i>All applicants: How important is it for applicants to take gap year?</i>	
Extremely important	24 (12)
Important	73 (38)
Not very important	84 (43)
Not at all important	13 (7)
<i>Non-gap year applicants (non-MD/PhD): What best describes why you took no gap year?</i>	
Lack of gap year opportunities (regardless of funding)	7 (7)
Lack of gap year funding	7 (7)
Already had research experience/publications	30 (29)
Already confident of chances to match	16 (15)
Unable or unwilling to delay the start of residency training	44 (42)
<i>Non-gap year applicants (non-MD/PhD): Would you have taken a gap year if you had funding?</i>	
Yes	30 (29)
No	74 (71)

Table 6

Predictors of taking gap year (univariate regression analysis)

Factor	Odds ratio*	P value
Older age	0.989	.851
More publications prior to gap year[†]	0.839	.007
More abstracts prior to gap year[†]	0.863	.007
Female (vs male)	0.918	.812
Married (vs not married)	0.812	.572
Dependents (vs no dependents)	1.114	.841
Master's degree	1.256	.568
Received financial aid	1.285	.495
Medical school offered research time[†]	3.911	<.001

* Higher odds ratio means higher likelihood of taking gap year.

[†] P value < .05 was considered significant.